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Enumeration of Family Fabaceae from Sechu Tuan Nalla Wildlife Sanctuary, Chamba District, Himachal Pradesh (India)

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ABSTRACT

An account of 20 species under 11 genera of the family Fabaceae is presented based upon a thorough study of the collected specimens and field surveys in this paper from Sechu Tuan Nalla Wildlife Sanctuary, Chamba district, Himachal Pradesh. Of these, fourteen taxa are reported first time from the Chamba district of the state. The updated nomenclature of the species, local name if any, a brief description of the plant, flowering and fruiting period, distribution in the study area, habitat and ecology and specimen examined have been provided.

1. Introduction

The Sechu Tuan Nalla Wildlife Sanctuary, a high-altitude sanctuary that lies in Sechu valley, a minor sub-valley of the major Pangi valley is located at the extreme northwest end of Chamba district of Himachal Pradesh. The wildlife sanctuary is located in the inner Trans Himalayan region between two great mountain ranges i.e. The Great Himalayan Range and Pir Panjal Range in the Chamba district of Himachal Pradesh. The sanctuary is situated within the geo-coordinates of North Lat. 33°10′55″ N & Long. 76°43′24″ E East Lat. 32°57′31″ & Long. 76°46′38″ E, South Lat. 32°49′49″ N & Long. 76°45′00″ E West Lat. 32°54′18″ & Long. 76°31′22″ E (Figure 1A-C). It is one of the innermost valleys of the Great Himalayas. It is bounded by the interstate boundary of Jammu and Kashmir in Northern and Lahaul-Spiti district (Himachal Pradesh) on the North-eastern and South-eastern sides.

Due to inaccessibility and difficult geographic conditions, this area had not been included in the earlier floristic surveys of the Chamba district [1-6]. Therefore, as such, no literature or any kind of comprehensive published document about the floristic diversity of the sanctuary is available for reference and use by forest officials and various other government agencies. Hence, an attempt has been made to document the members of the family Fabaceae from the study area.

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2. Materials and Methods

During the field surveys of Sechu Tuan Nalla Wildlife Sanctuary, Chamba district, Himachal Pradesh the author collected members of the family Fabaceae for assessment of the floristic diversity of the sanctuary. The collected specimens were processed and preserved as suggested by Jain & Rao [7]. Later on, the specimens were identified and an attempt has been made to bring out a systematic account of the family Fabaceae from the study area. Updated nomenclature of the species, local name if any, a brief description of the plant, flowering and fruiting period, distribution in the study area, habitat and ecology and specimen examined have been provided. The specimens are deposited in the herbarium of Botanical...
Survey of India, Northern Regional Centre, Dehradun (BSD).

3. Results and Discussions

This study revealed that the sanctuary inhabits 20 species under 11 genera of the family Fabaceae. All the reported genera fall under the subfamily Papilionoideae DC. as proposed by The Legume Phylogeny Working Group [9]. Genera and species are arranged alphabetically.

Enumeration


Perennial herbs, to 1.2 m tall; stems much branched, stipules free, lanceolate. Leaves imparipinnately compound. Flowers pale yellow or pinkish-white, dense, in axillary, pedunculate racemes. Pods turgid, glabrous.

Flowering & Fruiting: May-August.

Distribution in Sanctuary, habitat and ecology: Common, on dry open slopes at elevation between 3200 m-3400 m.

Specimen examined: Chogalu Dhar, P. Kumar 128192.


Perennial herbs or small shrubs; nearly 2 m high, stems erect, leaves 8 cm-18 cm long, imparipinnately compound. Inflorescence 5 cm-20 cm long, axillary, long peduncled raceme, many-flowered. Flowers c. 15 mm long, pale yellow and maroon-purple in some parts of corolla and calyx. Pods young 10-15 × 1.5-2 mm, stipitate, oblong, pointed at both ends, glabrous.

Flowering & Fruiting: July-September.

Distribution in Sanctuary, habitat and ecology: Not common, on open grassy slopes up to 3800 m.

Specimen examined: Along Triund Nalla towards Chogalu Dhar, P. Kumar 128161.


Annual herbs, ascending or suberect, 25 cm-55 cm high; stems slender, well branched, pubescent. Leaves imparipinnately compound. Flowers purplish, in axillary, pedunculate racemes. Pods c 1 cm long, unilocular, pubescent.

Flowering & Fruiting: June-September.

Distribution in Sanctuary, habitat and ecology: Common, in open grassy slopes, open forest area along river, sandy places, on open dry slopes in Pine forest, alpine scrub, moist open slopes and dry sandy river beds between 2800 m-4000 m.

Specimen examined: Eco-sensitive Zone near Tuan, P. Kumar 127140; Along Triund Nalla towards Chogalu Dhar, 127200; Harbi Dhar, P. Kumar 127314; Pepe Nalla, Chasakh Bhatori, P. Kumar 127474; Along Siddharmar Nalla upwards, P. Kumar 127619; Topiyun Dhar, 127668; Along Triund Nalha, P. Kumar 127841; Sidhani Dhar, P. Kumar 127970; Eco-sensitive zone, around Hillu and Tuan villages, P. Kumar 128056.


Perennial herbs; stems branched from base. Leaves imparipinnately compound. Flowers in an axillary pedunculated raceme, yellow. Pods c. 11 mm-13 mm long, silky, sessile.

Flowering & Fruiting: May-August.

Distribution in Sanctuary, habitat and ecology: Not common on open grassy slopes up to 3800 m.

Specimen examined: Towards North of Bhatori Seri along Siddharmar Nalla, P. Kumar 127554.

Note: Podlech & Zarre [9], Kumar & Sane [10], and De roliya et al. [11], have treated this species as synonym under the A. rhizanthus Royle ex Benth, however Chaudhary [12], considered it as two separate species.


Perennial herbs, to 15 cm-55 cm tall; stems branched, branches many from the base. Leaf imparipinnately compound. Flowers in an axillary pedunculate raceme. Pods sessile, globular or ovoid.

Flowering & Fruiting: June-August.

Distribution in Sanctuary, habitat and ecology: Not common, in moist gassy places near stream up to 3408 m.

Specimen examined: Along Triund Nalha towards Cho-

Perennial herbs; rootstock woody; aerial stem almost absent or reduced with crowded internodes. Leaf; imparipinnately compound. Flowers yellow in clustered, sessile or shortly peduncled racemes; Pods 1.2 cm-2.0 cm long, sessile, densely silky.

*Flowering & Fruiting:* June-July.

**Distribution in Sanctuary, habitat and ecology:** Common, on dry river beds and grassy slopes in alpine areas between 2900 m-4000 m. (Figure 2B)

*Specimen examined:* Pepe Nalla, Chasakh Bhatori, *P. kumar* 127437; Pepe Nalla, Chasakh Bhatori, *P. kumar* 127473; Pepe Nalla, Chasakh Bhatori, *P. kumar* 127498; Sidhani Dhar, *P. kumar* 128006; Eco-sensitive zone, around Hilu and Tuan villages, *P. kumar* 128046.


Perennial herbs, to 30 cm-55 cm high; stems erect, simple, glabrous. Leaf; imparipinnately compound. Inflorescence an axillary pedunculate raceme. Pods 2.2 cm-2.7 cm long, pubescent, unilocular, stipitate.

*Flowering & Fruiting:* July-September

**Distribution in Sanctuary, habitat and ecology:** Occasional, in alpine meadows and moist places along streams between 3500 m-3900 m. (Figure 2C)

*Specimen examined:* Along Sindhmarh Nalla upwards, *P. kumar* 127617; Harbi Dhar, *P. kumar* 127675; Way to Sidhani Dhar, 127643; Eco-sensitive zone, around Hillu and Tuan villages, *P. kumar* 127905; Along Triund Nalha towards Chogalu Dhar, *P. kumar* 128128.


**Jangli Mattar**

Perennial herbs; stems ribbed, zig-zag, branched. Leaves pinnate. Inflorescence 1-2 flowered; flowers purple or white. Pod 22 mm-29 mm long, beaked.

*Flowering & Fruiting:* June-August.

**Distribution in Sanctuary, habitat and ecology:** Occasional, in sandy places 2900 m-3600 m.


Uses: Fruits are eaten raw.


Perennial herbs, to 60 cm tall; stems erect. Leaves compound; leaflets 22-30, 1.7-2.3 cm long, narrowly ovate to elliptic, obtuse, mucronate, glabrescent above, pubescent below. Inflorescence a dense raceme; flowers yellowish. Pod stipitate, 1-2 jointed, joints oblong, membranous, wing crisped on the lower side and obscure above.

*Flowering & Fruiting:* June-August.

**Distribution in Sanctuary, habitat and ecology:** Occasional, in moist alpine grassy slopes 3400 m-3826 m. (Figure 2D) Endemic to India [Western Himalayas (Himachal Pradesh, Jammu & Kashmir, Uttarakhand)].

*Specimen examined:* Pepe Nalla, Chasakh Bhatori, *P. kumar* 127422; Eco-sensitive zone, around Hilu and Tuan villages, *P. kumar* 128057; Along Triund Nalha towards Chogalu Dhar, *P. kumar* 128128.


Perennial herbs, tufted, spreading, to 55 cm high; stems branched, grooved, Leaves imparipinnately compound. Flowers purple, in racemes. Pods 2-3-jointed, long-stipitate, membranous, entire, both sutures distinctly marginated.

*Flowering & Fruiting:* July-October.

**Distribution in Sanctuary, habitat and ecology:** Occasional, along streams and in moist places in thickets between 2700 m-3700 m. (Figure 2E) Endemic to India [Western Himalayas (Himachal Pradesh, Jammu & Kashmir, Uttarakhand)].

*Specimen examined:* Towards North of Bhatori Seri along Sindhmarch Nalla, 127557; Way to Sidhani Dhar, *P. kumar* 127775.

Note: Inspite of the fact that it is a purely high-altitude species, in literature it is also shown to distributed in Punjab (altitude range 150 m-550 m).


1) Sanjappa, Legum. India 201. 1992; Perennial herbs, to 90 cm high; stems suberect, branched. Leaves petioled, pinnately compound; Flowers cream or pink, turning yellow, in axillary racemes. Pods c 6 cm × 0.8 cm, cylindric, glabrous. 

Flowering & Fruiting: July-September

Distribution in Sanctuary, habitat and ecology: not common in moist shady places in forest up to 2918 m.

Specimen examined: Sidhani Dhar, P. Kumar 128001.


Perennial herbs; stems suberect, branched. Leaves paripinnately compound. Flowers purple to slightly blue, 2-6-flowered, in racemes. Pods c 5 cm × 0.5 cm, cylindrical, glabrous.

Flowering & Fruiting: June-July.

Distribution in Sanctuary, habitat and ecology: occasional, in partly shady places in forest up to 2881 m. (Figure 2F)

Specimen examined: Sechu Dhar & Eco-sensitive Zone, P. Kumar 127939; Sidhani Dhar, P. Kumar 127991.

(5) LESPEDEZA Michx., Fl. Bor.-Amer. 2: 70. t. 39. 1803.


Under shrub, up to 1 m tall; stems branched. Leaf trifoliolate. Inflorescence 2-4-flowered pedunculate umbel; flowers pale yellow or pink. Pod 2.5 mm-3.0 mm long, silky.

Flowering & Fruiting: July-September.

Distribution in Sanctuary, habitat and ecology: occasional, in dry open slopes between 2900 m-3400 m.

Specimen examined: Harbi Dhar, P. Kumar 127328; Along Triund Nalha towards Chogalu Dhar, P. Kumar 128169.


Perennial herbs, prostrate, ascending or decumbent, variable; stems branched. Leaves petioled, 5-foliolate. Flowers pale-yellow or orange, 3-6-flowered, in peduncled umbels. Pods c 3 cm × 0.4 cm, cylindrical, straight, glabrous.

Flowering & Fruiting: July-September.

Distribution in Sanctuary, habitat and ecology: common, on open dry and sandy slopes between 3000 m-3900 m. (Figure 2G)

Specimen examined: Eco-sensitive Zone near Tuan, P. Kumar 127133; Pepe Nalla, Chasakh Bhatori, P. Kumar 127493.


Perennial herbs up to 80 cm long; stems erect or procumbent. Leaves compound. Inflorescence a peduncled raceme. Pods 8 mm-11 mm long, c. 2.5 mm broad, nearly straight to crescentic.

Flowering & Fruiting: March-August.

Distribution in Sanctuary, habitat and ecology: occasional, on open slopes up to 3006 m. (Figure 2H)

Specimen examined: Eco-sensitive Zone near Tuan, P. Kumar 127106.


Annual or perennial herbs, up to 60 cm long; stems prostrate or ascending. Leaves compound. Inflorescence an axillary, pedunculate raceme; flowers yellow. Pods 2 mm-3 mm, curved.

Flowering & Fruiting: July-September.

Distribution in Sanctuary, habitat and ecology: occasional on moist slopes up to 3606 m.

Specimen examined: Along Jamboo Nalha, P. Kumar 127936.

(8) OXYTROPIS DC., Astragalogia 24, 66; 19. 53.1802.


Perennial herbs, to 8 cm-30 cm tall; rootstock woody; aerial stem with 2 or more apparent internodes. Leaves compound. Flowers in many flowered racemes; flowers pale purple. Pod cylindric, stipitate inflated, unilocular.

Flowering & Fruiting: June-September.

Distribution in Sanctuary, habitat and ecology: common, in moist open slopes near glacier, alpine grassy, open dry and sandy slopes between 2700 m-4000 m.

Specimen examined: Sechu Dhar, P. Kumar 127282; Pepe Nalla, Chasakh Bhatori, P. Kumar 127405; Along Sindhmar Nalla upwards, P. Kumar 127578; Along Sindhmar Nalla upwards, P. Kumar 127612; Topiyun Dhar, 127694; Harbi Dhar, P. Kumar 127833; Along Triund Nalha, 127880, 128198; Sidhani Dhar, P. Kumar 128024; Eco-sensitive zone, towards Sidhani bia Mujh village, P. Kumar 127978,132545; Eco-sensitive zone, around Hillu and Tuan villages, P. Kumar 128042.


Annual or perennial herbs, tufted, to 20 cm high; stems stout, branched from base. Leaves shortly petioled, trifoliolate. Flowers deep purple, showy, crowded, in axillary and terminal racemes. Pods linear-oblong, hairy.

Flowering & Fruiting: July-September.

Distribution in Sanctuary, habitat and ecology: occasional, on moist open slopes up to 3500 m. (Figure 2I)

Specimen examined: Along Triund Nalha towards Chogalu Dhar, P. Kumar 128178.


Perennial herbs, trailing, glabrous; stems slender, prostrate, branched. Leaves petioled, trifoliolate. Flowers white, fragrant, many-flowered, clustered, in pedunculate, globose racemes forming heads. Pods minute, linear, included, 3-4-seeded.

Flowering & Fruiting: July-September.

Distribution in Sanctuary, habitat and ecology: common, in moist places, 3000 m-3200 m. (Figure 2J)

Specimen examined: Sechu Dhar, P. Kumar 127291; Harbi Dhar, P. Kumar 127835.


Kuchona

Perennial herbs, erect or ascending; stems much branched. Leaves pinnately trifoliolate. Flowers yellow, in axillary pedunculate condensed racemes. Pods c 1.4 cm × 0.2 cm, linear-oblong, straight, glabrous, veins prominent.

Flowering & Fruiting: July-September.

Distribution in Sanctuary, habitat and ecology: common, in moist places sandy river beds 2900 m-3600 m.

Specimen examined: Sidhani Dhar, P. Kumar 127996; Eco-sensitive zone, around Hillu and Tuan villages, P. Kumar 128058; Along Triund Nalha towards Chogalu Dhar, P. Kumar 128148.

Uses: Young shoots are used as vegetable.
4. Conclusions

This study reveals that Sechu Tuan Nalla Wildlife Sanctuary harbours a considerable number of taxa of the family Fabaceae, which is 2.98 percent of the total taxa of Fabaceae of the state [6], whereas it is 24.39 percent of the total taxa of Fabaceae of the district Chamba [1,9]. Two species namely Hedysarum astragaloides Benth. and H. microcalyx Baker are endemic to North-West Himalayas. Five taxa viz., Astragalus coluteocarpus subsp. chitralensis Wenn., A. melanostachys Benth. ex Bunge, A. tecti-mundi subsp. orientalis Podlech, Hedysarum microcalyx Baker, and Oxytropis lapponica (Wahl.) Gayare reported first time from Chamba district, Himachal Pradesh.

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Conflict of Interest

Authors declare no conflict of interests.

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